IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Stephen L. Casper et al.

Application No.: 10/076,486 Group Art Unit: 2818

Filed: February 19, 2002 Examiner: M. Tran

For: PROGRAMMABLE CONDUCTOR RANDOM ACCESS MEMORY AND METHOD FOR SENSING SAME

THIRD INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
Washington, DC 20231

Dear Sir:

Pursuant to 37 C.F.R. § 1.56, the attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached PTO/SB/08. It is respectfully requested that the subject matter of the documents be expressly considered during the prosecution of this application and that the documents be made of record therein and appear among the "References Cited" on any patent to issue from this application. A copy of each document is attached.

This Third Information Disclosure Statement is being filed concurrently with an Amendment.

A brief explanation of relevance of certain non-patent documents listed on Form PTO/SB/08 is provided and attached hereto as Appendix A. The brief explanation provided for each document is not tantamount to an admission that a document is "material" or that it qualifies as prior art. The Examiner is respectfully requested to utilize

Appendix A only as a tool by which to better categorize the documents for substantive use in examining the claims of the application.

Documents discussed in Appendix A marked with an asterisk (*) are indicated to be potentially more relevant than others. Such marking is provided only to assist the Examiner; however, the Examiner is requested to thoroughly review all documents cited herein.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Third Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 C.F.R. § 1.56(a) exists. It is submitted that this Third Information Disclosure Statement is in compliance with 37 C.F.R. § 1.98 and the Examiner is respectfully requested to consider and cite the listed documents.

The Director is hereby authorized to charge the $180.00 fee as required by 37 C.F.R. §1.17(p) to the undersigned attorneys' credit card. Form PTO-2038 is attached. The Commissioner also is authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm), to our Deposit Account No. 04-1073, under Order No. M4065.0479/P479.

Dated: September 16, 2003

Respectfully submitted,

By _____

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APPENDIX A

Japanese patent application publication No. 56126916A by Akira: this published application generally relates to, inter alia, diffusing selenium with high accuracy into a chalcogenide with silver by use of photoresist and thermal treatment.

*Axon Technologies Corp., *Technology Description*: *Programmable Metallization Cell*: this believed publication generally relates to, inter alia, use of chalcogenides doped with metal much as silver or copper to create solid state switch with lower voltage requirement.

Helbert et al., SPIE Vol. 333 Submicron Lithography (1982): this publication generally relates to, inter alia, hybrid ultragraphic process using both electron beam and conventional optical exposure within the same device level with a photoresist.

Hilt, dissertation (1999): this publication generally relates to, inter alia, stability of chalcogenides such as Ge_xSe_{1-x} with Ag doping by photodissolution and thermal diffusion.

Hirose et al., Phys. Stat. Sol. (1980): this publication generally relates to, inter alia, switch and memory phenomena in amorphous As_2S_3 with photo-doped Ag, including new mechanism, electrical reliability, rapid memory performance, thermal characteristics and durability

Holmquist et al., 62 J. Amer. Ceram. Soc., No. 3-4 (March-April 1979): this publication generally relates to, inter alia, reactions and diffusion of Ag in arsenic chalcogenide glass below the glass transition temperature, including solubility information and concentration dependence of Ag diffusion in these glasses.

Huggett et al., 42 Appl. Phys. Lett., No. 7 (April 1983): this publication generally relates to, inter alia, reactive sputter etching to develop silver-sensitized Ge_xSe_{1-x} photoresist.

Kawaguchi et al., 164-166 J. Non-Cryst. Solids (1993): this publication generally relates to, inter alia, deposition mechanism of Ag particles on Ag-rich Ag-As-S glass from a view-point of electrical effects.

*Kolobov and Elliott, Advances in Physics (1991): this publication generally relates to, inter alia, photodoping (photodiffusion/photodissolution) of amorphous chalcogenides by metals, particularly silver.

*Kozicki et al., Superlattices and Microstructures, 27 (2000): this publication generally relates to, inter alia, solid solutions of metals (e.g., silver) in arsenic trisulfide and their physical and electrical characteristics.

*Kozicki et al., Microelectronic Engineering, vol. 63/1-3 (2002): this publication generally relates to, inter alia, the photodiffusion of Ag into germanium selenide glass films, the amount of Ag that can be incorporated in to such a film by photodiffusion, and the characteristics of the resulting doped films.

*Kozicki et al., Proceedings of the 1999 Symposium on Solid State Ionic Devices (1999): this publication generally relates to, inter alia, physical and electrical characteristics of metal doped chalcogenide films (photodoped $Ag_4As_2S_3$) between electrodes, useful in memories, configurable connections, and self-repairing interconnections.

*Kozicki and Mitkova, Proceedings of the XIX International Congress on Glass, Society for Glass Technology (2001): this publication generally relates to, inter alia, the physical effects of introduction of Ag into chalcogenide glasses, where introduction is by photodiffusion.

McHardy et al., 20 J. Phys. C.: Solid State Phys. (1987): this publication generally relates to, inter alia, sensitivity and high resolution of metals in amorphous chalcogenides by electron and UV radiation.

Owen et al., Nanostructure Physics and Fabrication (1989): this publication generally relates to, inter alia, photo-induced structural or physico-chemical changes of amorphous chalcogenides when exposed to light/irradiation, affecting chemical solubility.

Shimizu et al., 46 B. Chem Soc. Japan, No. 12 (1973): this publication generally relates to, inter alia, electric conductivity increase by increasing Ag-photodoping of chalcogenide glass.

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Sheet	1	of	4

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Art Unit	2818
Examiner Name	M. Tran
Attorney Docket Number	M4065.0479/P479

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	6,469,364	10/2002	Kozicki	
	AB	2002/0168820 App.	11/2002	Kozicki	
	AC	2000/0072188 App	6/2002	Gilton	
	AD	2002/0123169 App	9/2002	Moore et al.	
	AE	2002/0123248 App.	9/2002	Moore et al.	
	AF	3,622,319	11/1971	Sharp	
	AG	3,743,847	7/1973	Boland	
	AH	4,269,935	5/1981	Masters et al.	
	AI	4,312,938	1/1982	Drexler, et al.	
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	AK	4,320,191	3/1982	Yoshikawa et al.	
	AL	4,405,710	9/1983	Balasubramanyam et al.	
	AM	4,419,421	12/1983	Wichelhaus, et al.	
	AN	4,795,657	1/1989	Formigoni et al.	
	AO	4,847,674	7/1989	Sliwa et al.	
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	AR	5,219,788	6/1993	Abernathey et al.	
	AS	5,238,862	8/1993	Blalock et al.	
	AT	5,315,131	5/1994	Kishimoto et al.	
	AU	5,350,484	9/1994	Gardner et al.	
	AV	5,360,981	11/1994	Owen et al.	
	AW	5,512,328	4/1996	Yoshimura et al.	
	AX	5,512,773	4/1996	Wolf et al.	
	AY	5,726,083	3/1998	Takaishi	
	AA1	5,841,150	11/1998	Gonzalez et al.	
	AB1	5,846,889	12/1998	Harbison et al.	
	AC1	5,920,788	7/1999	Reinberg	
	AD1	5,998,066	12/1999	Block et al.	
	AE1	6,077,729	6/2000	Harshfield	
	AF1	6,117,720	9/2000	Harshfield	
	AG1	6,143,604	11/2000	Chiang et al.	
	AH1	6,177,338	1/2001	Liaw et al.	
	AI1	6,236,059	5/2001	Wolstenholme et al.	
	AJ1	6,297,170	10/2001	Gabriel et al.	
	AK1	6,300,684	10/2001	Gonzalez et al.	
	AL1	6,316,784	11/2001	Zahorik et al.	
	AM1	6,329,606	12/2001	Freyman et al.	
	AN1	6,350,679	2/2002	McDaniel et al.	
	AO1	6,376,284	4/2002	Gonzalez et al.	
	AP1	6,391,688	5/2002	Gonzalez et al.	
	AQ1	6,414,376	7/2002	Thakur et al.	
	AR1	6,423,628	7/2002	Li et al.	
	AS1	6,487,106	11/26/2002	Kozicki	
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	AU1	2002/0190350 APP	12/19/2002	Kozicki	
	AV1	2003/0027416 APP	2/6/2003	Moore	
	AW1	2003/0001229 APP	1/2/2003	Moore et al.	
	AX1	2002/0106849 APP	8/8/2002	Moore	
	AY1	2002/0127886 APP	9/12/2002	Moore et al.	
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	BC1	5,272,359	12/93	Nagasubramanian et al.	
	BD1	4,671,618	6/87	Wu et al.	
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	BG1	2003/0035315	02/20/03	Kozicki	
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	BA	JP 56126916	10/1981	Akira et al.		
	BB					

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OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	CA	Axon Technologies Corporation, TECHNOLOGY DESCRIPTION: *Programmable Metalization Cell(PMC)*, pp. 1-6 (Pre-May 2000).	
	CB	Helbert et al., *Intralevel hybrid resist process with submicron capability*, SPIE Vol. 333 SUBMICRON LITHOGRAPHY, pp. 24-29 (1982).	
	CC	Hilt, DISSERTATION: *Materials characterization of Silver Chalcogenide Programmable Metalization Cells*, Arizona State University, pp. Title page-114 (UMI Company, May 1999).	
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	CG	Kawaguchi et al., *Mechanism of photosurface deposition*, 164-166 J. NON-CRYST. SOLIDS, pp. 1231-1234 (1993).	
	CH	Kolobov and Elliott, Photodoping of Amorphous Chalcogenides by Metals, Advances in Physics, Vol. 40, No 5, 625-684 (1991).	
	CI	Kozicki, et al., "Applications of Programmable Resistance Changes in Metal-doped Chalcogenides", Proceedings of the 1999 Symposium on Solid State Ionic Devices, Editors - E.D. Wachsman et al., The Electrochemical Society, Inc., 1 - 12 (1999).	
	CJ	Kozicki, et al., *Nanoscale effects in devices based on chalcogenide solid solutions*, Superlattices and Microstructures, 27, 485-488 (2000).	
	CK	Kozicki, et al., *Nanoscale phase separation in Ag-Ge-Se glasses,* Microelectronic Engineering, vol. 63/1-3,155-159 (2002).	
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	CM	McHardy et al., *The dissolution of metals in amorphous chalcogenides and the effects o electron and ultraviolet radiation*, 20 J. PHYS. C.: SOLID STATE PHYS., pp. 4055-4075 (1987)*f*	
	CN	Owen et al., *Metal-Chalcogenide Photoresists for High Resolution Lithography and Sub-Micron Structures*, NANOSTRUCTURE PHYSICS AND FABRICATION, pp. 447-451 (M. Reed ed. 1989).	
	CO	Shimizu et al., *The Photo-Erasable Memory Switching Effect of Ag Photo-Doped Chalcogenide Glasses*, 46 B. CHEM SOC. JAPAN, No. 12, pp. 3662-3365 (1973).	
	CP	Michael N. Kozicki, *1. Programmable Metallization Cell Technology Description*, February 18, 2000	
	CQ	Michael N. Kozicki, Axon Technologies Corp. and Arizona State University, Presentation to Micron Technology, Inc., April 6, 2000	

Examiner Signature		Date Considered	

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ocuments Filed:

Second Information Disclosure Statement w/Form PTO/SB/08A and 120 references

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ender's Initials: TJD/SPT/rrl **Date:** September 26, 2002

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	AA	6,388,324	05/14/2002	Kozicki et al.	
	AB	US 2002/0000666	01/03/2002	Kozicki et al.	
	AC	5,500,532	03/19/1996	Kozicki et al.	
	AD	6,418,049	07/09/2002	Kozicki et al.	
	AE	5,751,012	05/12/1998	Wolstenholme et al.	
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	BA	WO 02/21542	03/14/2002	Kozicki et al.		
	BB	WO 00/48196	08/17/2000	Kozicki et al.		
	BC	WO 97/48032	12/18/1997	Kozicki et al.		
	BD	WO 99/28914	06/10/1999	Kozicki et al.		

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	CA	Abdel-All, A.; Elshafie,A.; Elhawary, M.M., DC electric-field effect in bulk and thin-film Ge5As38Te57 chalcogenide glass, Vacuum 59 (2000) 845-853.	
	CB	Adler, D.; Moss, S.C., Amorphous memories and bistable switches, J. Vac. Sci. Technol. 9 (1972) 1182-1189.	
	CC	Adler, D.; Henisch, H.K.; Mott, S.N., The mechanism of threshold switching in amorphous alloys, Rev. Mod. Phys. 50 (1978) 209-220.	
	CD	Afifi, M.A.; Labib, H.H.; El-Fazary, M.H.; Fadel, M., Electrical and thermal properties of chalcogenide glass system Se75Ge25-xSbx, Appl. Phys. A 55 (1992) 167-169.	
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	CI	Aniya, M., Average electronegativity, medium-range-order, and ionic conductivity in superionic glasses, Solid state Ionics 136-137 (2000) 1085-1089.	
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	CK	Asokan, S.; Prasad, M.V.N.; Parthasarathy, G.; Gopal, E.S.R., Mechanical and chemical thresholds in IV-VI chalcogenide glasses, Phys. Rev. Lett. 62 (1989) 808-810	
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	CT	Bernede, J.C.; Conan, A.; Fousenan't, E.; El Bouchairi, B.; Goureaux, G., Polarized memory switching effects in Ag2Se/Se/M thin film sandwiches, Thin solid films 97 (1982) 165-171.	
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		Glasses, Asian Journal of Physics (2000) 9, 709-72.	
	CX	Boolchand, P.; Bresser, W.J., Mobile silver ions and glass formation in solid electrolytes, Nature 410 (2001) 1070-1073.	
	CY	Boolchand, P.; Georgiev, D.G.; Goodman, B., Discovery of the Intermediate Phase in Chalcogenide Glasses, J. Optoelectronics and Advanced Materials, 3 (2001), 703	
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Atty Docket No.: M4065.0479/P479

Inventor: Stephen L. Casper, et al.

Application No.: 10/076,486 **Filing Date:** February 19, 2002

Title: PROGRAMMABLE CONDUCTOR RANDOM ACCESS MEMORY AND METHOD FOR SENSING SAME

Documents Filed:

Transmittal (1 page)

Information Disclosure Statement (4 pages; 2 copies)

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5 U.S. Patent References

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	1	of	1

Complete if Known	
Application Number	10/076,486
Filing Date	February 19, 2002
First Named Inventor	Stephen L. Casper
Art Unit	2818
Examiner Name	Not Yet Assigned
Attorney Docket Number	M4065.0479/P479

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Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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